



SMART-1/Clementine study of Humorum and Procellarum Basins

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We have combined SMART-1 AMIE camera images with Clementine UV/VIS data for two end-member lunar basins (circular - Mare Humorum and irregular - Oceanus Procellarum), to determine the coupling between basin origin, tectonics. For Humorum, these tectonic-induced features, which include graben, thrust faults and strike-slip faults, were mapped using ARC-GIS. Resulting tectonic maps agree well with an idealized tectonic model (Melosh 1978). In contrast, the main tectonic features at Procellarum are wrinkle ridges. In the absence of significant Bouguer anomalies at Procellarum, these features cannot be mascon-related.

We used Advanced Moon micro-Imager Experiment (AMIE) on ESA SMART-1 Moon mission, average pixel resolution of 80m. We also used UV/VIS pictures (multi-spectral images assessing the surface mineralogy of the Moon) and gravity maps derived after Clementine Moon mission (gravitational anomalies and crustal thickness maps).

The evolution for Humorum follows a general model for lunar multi-ring basins, with a melt produced after basin forming impact after whole mantle convection, and extrusion caused by excavation of noritic crustal parts. For Procellarum, irregular basin of graben origin, there is no clear evidence of a basin forming impact and thick anorthositic crust: melt production and extrusion controlled by processes other than multi-ring basins. Chemical components imply KREEP as primal source for Procellarum basalts. The melt is likely to be generated by radiogenic heating